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Effect of Phosphorous and Potash Fertilizer on Green Fodder and Seed Yield of Berseem (Egyptian clover) under Faisalabad Conditions

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Abstract

A field trial was conducted for two years 2015 and 2016, at Agronomy (Forage Production) Section Ayub Agricultural Research Institute, Faisalabad to see the effect of phosphorous and potash fertilizer on green fodder yield and seed yield of berseem. Two phosphorous levels 60kgs and 90 kgs per hectare and three potash fertilizer levels 0, 30, 60 kgs per hectare were applied in a plot size of 3m x 6m. Recommended doses of N and irrigations were applied. Lay out of the experiment was split plot design with three repeats. Physical parameters such as final plant height (cm) .No of tillers per plant , No of plants per meter square, green fodder yield tons per hectare, No of seeds per capsule, 1000 grain weight (gm.) and seed yield data tons per hectare were recorded. It was revealed from the recorded data that in the treatment T-6 (P=90, K= 60 Kgs per hectare) gave maximum plant height 64.66 cm, no of plants per meter square (173), No of tillers per plant (11.66) and green fodder yield (92.33 tons per hectare), No of seeds per capsule (61.0), Thousands grain wt 92.44 gm) and seed yield (1.14 tons per hectare) which is more than all the treatments in the experiment. Based on these observations, this can easily be concluded that by using 90 kgs phosphorous and 60 kgs potash per hectare in berseem we can easily achieve maximum green fodder and seed yield.

Key words: Yield; berseem; flowering; capsule; fodder and tillers.

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1. Introduction

Berseem is important Rabi fodder of Pakistan and is sown at an area of 78% among all other Rabi fodders sown. Fodder crop area of Pakistan is 2.11 million hectare and production is 45.77 million tons. It accounts for 3.2 percent in the value added in agriculture and 0.7 percent of GDP. Berseem is the largest Rabi (winter) season cattle fodder grown in the country, 88 per cent of which grows in Punjab, 9 per cent in Sindh, two per cent in the NWFP and 0.5 per cent in Balochistan. Some berseem varieties have the potential to boost fodder yields 2 to 3 times when compared to existing varieties [1]. It is a popular fodder for milch animals. It provides superior and cheap nutrition for prolonged period to the cattle and helps in enhancing milk production. To add to this, it is a legume fodder and therefore adds nutrients essential to maintain soil fertility and productivity. Berseem contains 20-24 per cent proteins, 2.89 per cent calcium and 0.4 per cent phosphate at the green stage. Production of Berseem seed is neglected by farmers, government organizations and private sectors [2]. Needless to say that the critical constraint for profitable livestock production in developing countries is related to inadequacy of quality forage which is further being aggravated by increased urbanisation and enhanced shifting trend of agriculture towards cash crops which further reduces the area under fodder crops. Moreover in our region, low per acre fodder yield coupled with two important fodder scarcity periods (one during summer and other during winter months), which, further aggravated the fodder availability situations. Among major limiting factors which lowers berseem yield are less use of P and K fertilizer by the farming community which results in low green fodder yield of Egyptian clover. The result of this study provides information to the farming community for obtaining maximum fodder and seed yield from Berseem crop. In many areas of Pakistan, there is shortage of fodder for livestock and available fodder not good quality. Phosphorous is one of the most important nutrient after nitrogen [3]. Role of Phosphorous increase plant height, stem diameter, green fodder and seed yield [4]. Berseem fodder plays an important role in livestock production, especially in tropical zone where fodder can not meet the requirement of livestock [5] but its shortage due to no or less use of P and K fertilizers is the major limiting factor in Pakistan..

Keeping in view the above problem the present study was planned to determine the effect of different level of phosphorous and potash for obtaining maximum green fodder and seed yield of Berseem fodder under Faisalabad conditions in Pakistan.

2. Material and methods

The study was conducted at Agronomy (Forage Production) Section Ayub Research Institute Faisalabad during 2015-16. The experiment was laid out in split plot design with three replications. Six different fertilizer levels were tested in the trial. The size of each plot was 3 x 6m. Berseem seed broadcasted uniformly on each plot after preparation of land. First irrigation was applied at the time of sowing, while 2nd irrigation was applied about 12 days after sowing for the better establishment of fodder crop. Recommended dose of N and irrigations were applied. Data regarding final plant height(cm), No of tillers per plant, No of plants per meter square, Thousands grain weight (gm), green fodder yield tons per hectare. No of seed per capsule and seed yield tons per hectare were also recorded.

3. Result and discussions

It was revealed from the recorded data that in the treatment T-6 (P-90,K-60 Kg/ha) gave maximum plant height 64.66 cm,no of tillers per plant 11.6, no of plants per meter square (173), green fodder yield (92.33 tons per hectare),no of seeds per capsule 61,thousands grain wt 2.44gm and seed yield 1.14 tons/ha which is more than all the treatments in the experiment.

Plant Height CM:

Plant height (cm) of Berseem affected by different levels of Phosphorous and Potash fertilizers.

Maximum Plant height (cm) obtained in T-6 (P=90, K= 60 Kg per hectare) 64.66 (cm) compared with treatment T-1(60P+0K) with lowest plant height 51.66 (cm) (Table: 1).

Tillers / Plant:

Tillers/plant of Berseem affected by different levels of Phosphorous and Potash fertilizers.

Maximum tillers/plant obtained in T-6 (P=90, K= 60 Kg per hectare) 11.66 compared with treatment T-1(60P+0K) with lowest tillers per plant 8.3 (Table: 1).

Plants / Meter Square:

Plants/meter square of Berseem affected by different levels of Phosphorous and Potash fertilizers.

Maximum plants/meter square obtained in T-6 (P=90, K= 60 Kg per hectare) 173 compared with treatment T-1(60P+0K) with lowest plants per meter square 124.66 (Table: 1).

Green Fodder Yield:

Green fodder yield of Berseem affected by different levels of Phosphorous and Potash fertilizers.

Maximum green fodder yield obtained in T-6 (P=90, K= 60 Kg per hectare) 92.33 t/ha compared with treatment T-1(60P+0K) with lowest yield 38.33 t/ha (Table:1).

No of Seeds /Capsule:

No.of seed/capsule of Berseem affected by different levels of Phosphorous and Potash fertilizers.

Maximum No. of seed/capsule obtained in T-6 (P=90, K= 60 Kg per hectare) 61 compared with treatment T-1(60P+0K) with lowest no of seeds per capsule 38.33 (Table: 1).

1000 grain wt (gm):

Thousand grain weight (gm) of Berseem affected by different levels of Phosphorous and Potash fertilizers.

Maximum thousand grain weight (gm) obtained in T-6 (P=90, K= 60 Kgs per hectare) 2.44 (gm) compared with treatment T-1(60P+0K) with lowest thousands grain wt 1.89gm (Table: 1).

Seed yield (t/ha):

Seed yield t/ha of Berseem affected by different levels of Phosphorous and Potash fertilizers.

Maximum seed yield t/ha obtained in T-6 (P=90, K= 60 Kg per hectare) 1.14 t/ha compared with treatment T-1(60P+0K) with lowest seed yield .78 t/ha (Table: 1).

Table 1: Effect of Phosphorus and Potash fertilizer on green fodder and seed yield of Berseem

Fertilizer levels(Kgs/ha)	Plant height cm	Tillers /plant	Plants/meter square	Green fodder yield(t/ha)	No of seeds/capsule	1000 grain wt (gm)	Seed yield (t/ha)
T-1(60P+0K)	51.66	8.3	124.66	51.33	38.33	1.89	.78
T-2(60P+30K)	56.00	8.3	125.00	55.67	41.33	1.94	.82
T-3(60P+60K)	59.33	9.0	141.00	58.0	51.0	1.98	.90
T-4(90P+0K)	61.33	10.0	162.66	76.33	51.0	2.14	.92
T-5(90P+30K)	63.00	11.0	166.00	86.33	58.0	2.28	1.01
T-6(90P+60K)	64.66	11.66	173.00	92.33	61.0	2.44	1.14

LSD 11.53

CV= 2.30

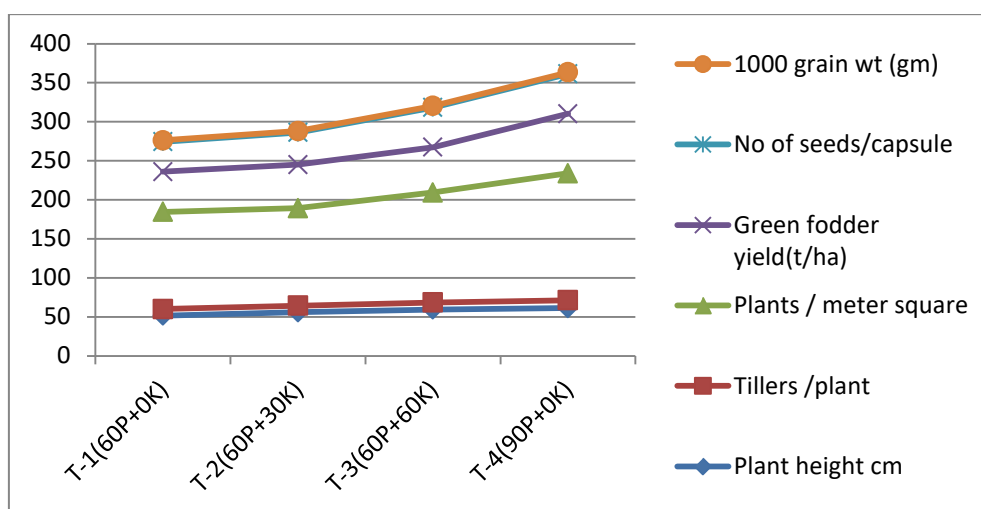


Figure 1: Effect of different fertilizer levels on Berseem Fodder

Reference [6] reported that phosphorus is important for increase yield of most crops. Reference [4,7] reported that total yield of fodder increased with increased level of phosphorus. It was revealed from the recorded data that in the treatment gave maximum plant height 64.66 cm, no of plants per meter square (173), No of tillers per plant (11.66) and green fodder yield (92.33 tons per hectare), No of seeds per capsule (61.0), Thousands grain wt 92.44 gm) and seed yield (1.14 tons per hectare) was recorded in treatment 90Kg phosphorus and 60 Kg potash applied which is more than all the treatments in the experiment.

4. Conclusion

It was concluded from the trial results that by applying 90 Kg phosphorus and 60 Kg potash per hectare fertilizer to berseem we can easily get maximum green fodder yield 92.33 t/ha and seed yield 1.14 t /ha under Faisalabad conditions in Pakistan.

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